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(54) **SYSTEM AND METHOD FOR TREATING SURFACE OF MEDIA WITH A DIGITALLY ADDRESSABLE DRYER ARRAY TO REDUCE MOISTURE GRADIENT AND MEDIA COCKLE**

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B41J 2/01	(2006.01)
B41J 2/475	(2006.01)
B41J 2/447	(2006.01)

(52) **U.S. Cl.**

CPC ***B41J 11/002*** (2013.01); ***B41J 2/01*** (2013.01); ***B41J 2/447*** (2013.01); ***B41J 2/475*** (2013.01)

(58) **Field of Classification Search**

CPC B41J 2/44; B41J 2/475; B41J 2/447; B41J 11/002

USPC 347/5, 101, 102, 16

See application file for complete search history.

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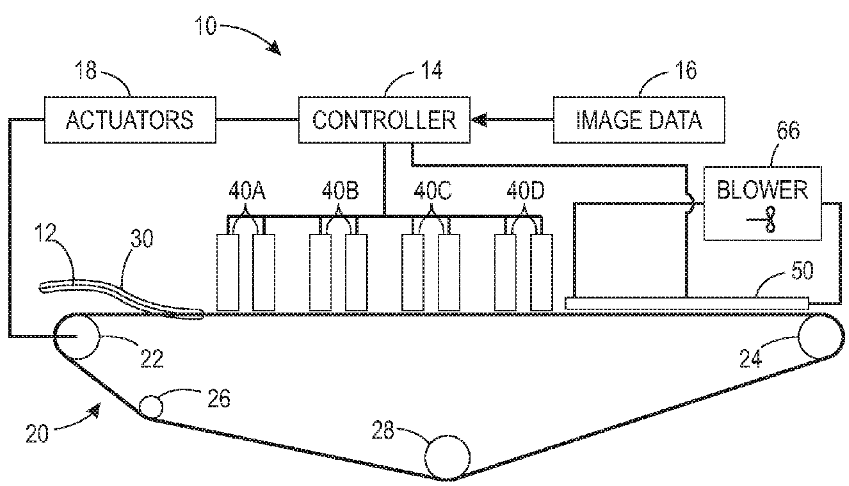
(57) **ABSTRACT**

A printer comprises at least one printhead having a plurality of inkjets, a dryer having an array of radiators including a plurality of rows of radiators and a plurality of columns of radiators, a media transport configured to move media past the at least one printhead and the dryer, and a controller operatively connected to the at least one printhead, the dryer, and the media transport. The controller is configured to activate selectively the radiators in the array of radiators to heat the portions of the surface of the media on which ink has been ejected. A method for operating the printer is also disclosed.

17 Claims, 4 Drawing Sheets



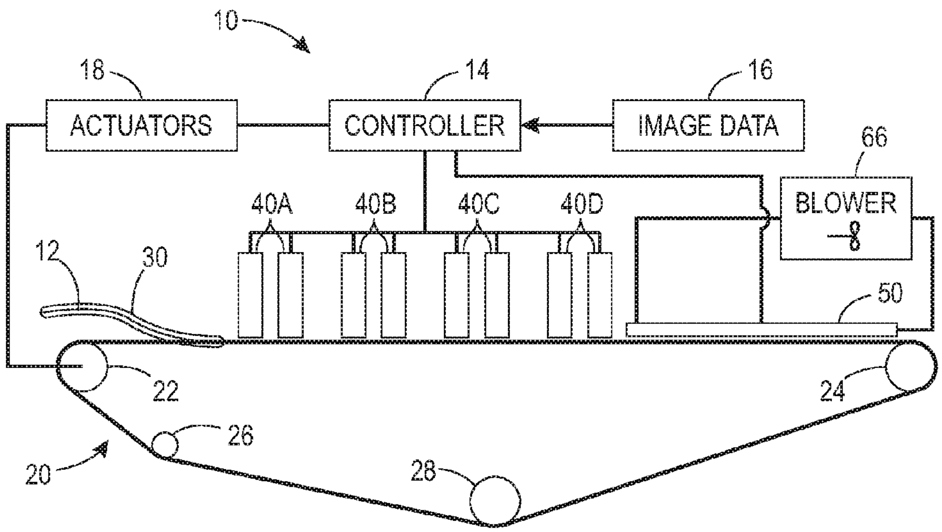

10
18
14
16
ACTUATORS
CONTROLLER
IMAGE DATA
66
BLOWER
40A
40B
40C
40D
12
30
50
22
24
26
20
28

FIG. 1

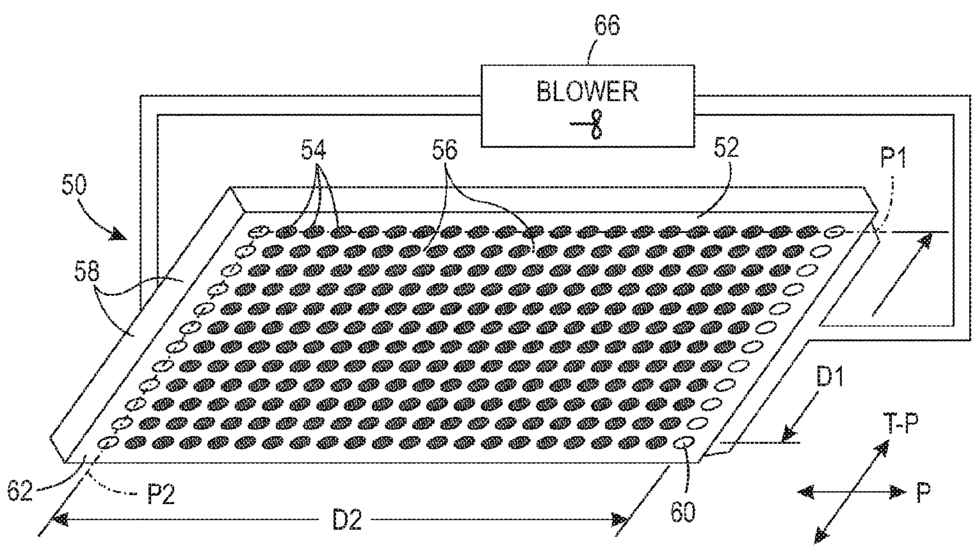

66
BLOWER
50
54
56
52
P1
58
D1
T-P
P
62
P2
D2
60

FIG. 2

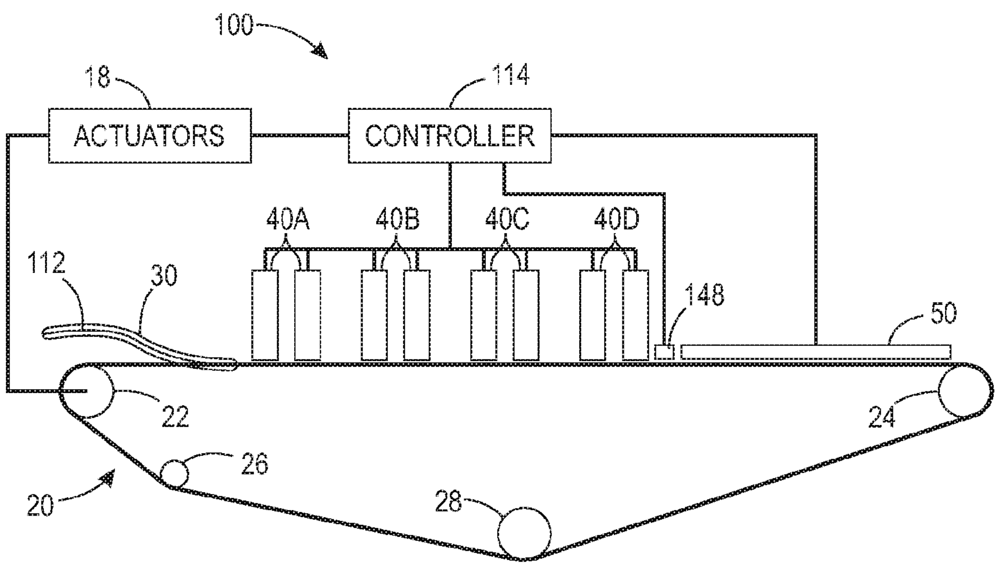

100
18
ACTUATORS
114
CONTROLLER
40A
40B
40C
40D
112
30
148
50
22
24
26
20
28

FIG. 3

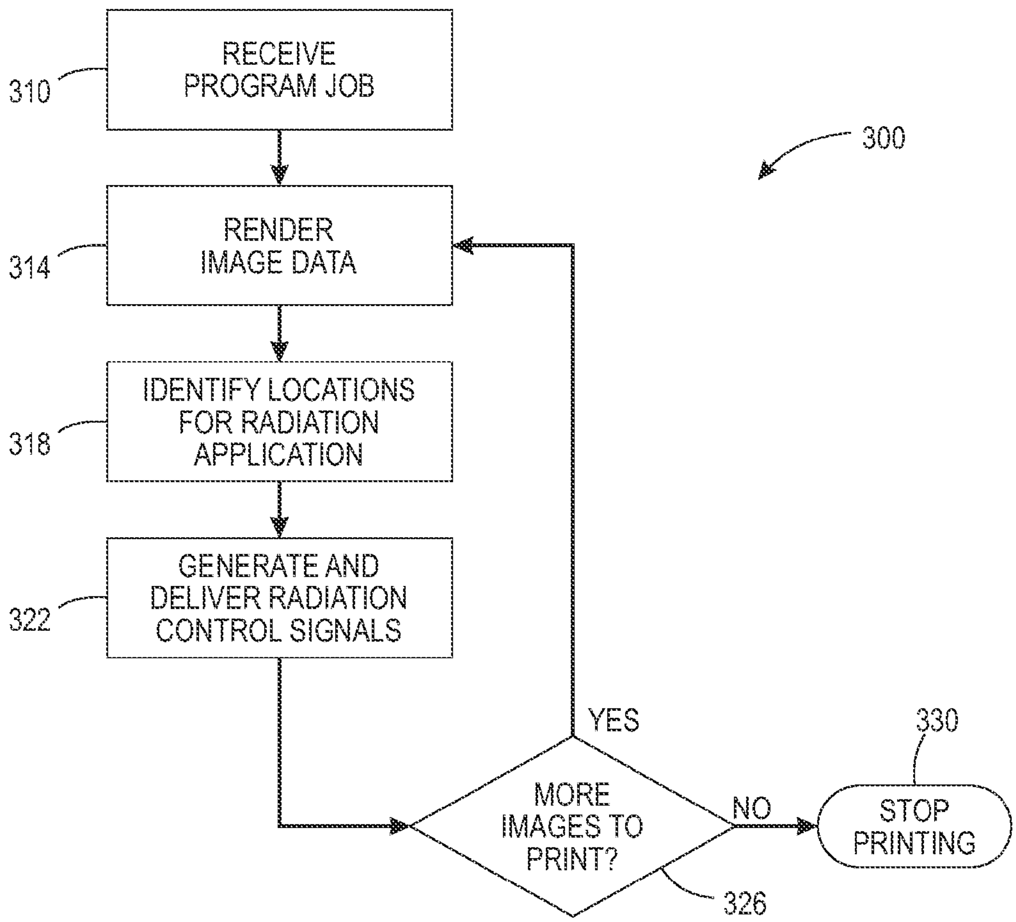
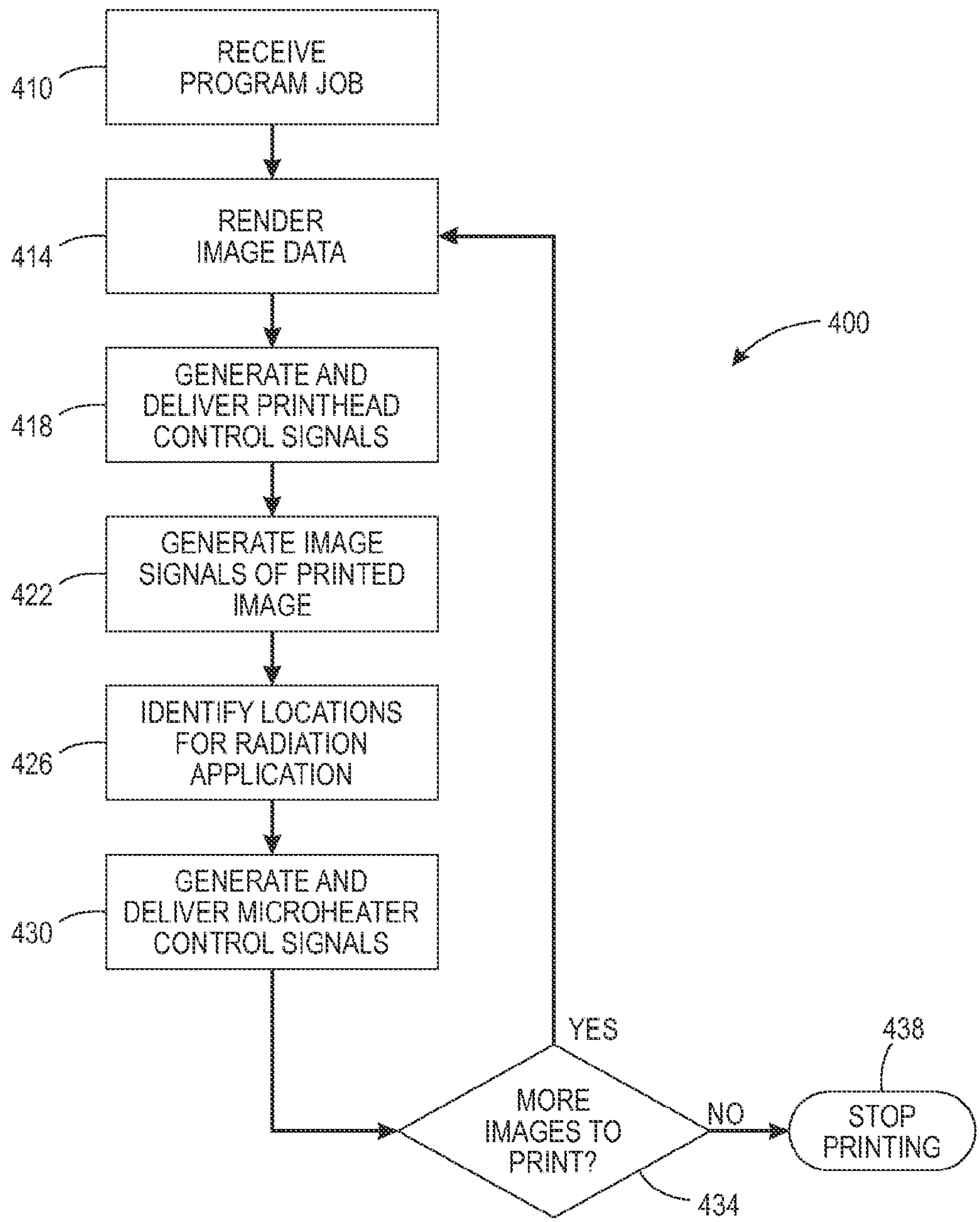

RECEIVE PROGRAM JOB
310
300
RENDER IMAGE DATA
314
IDENTIFY LOCATIONS FOR RADIATION APPLICATION
318
GENERATE AND DELIVER RADIATION CONTROL SIGNALS
322
YES
330
MORE IMAGES TO PRINT?
NO
STOP PRINTING
326

FIG. 4



RECEIVE PROGRAM JOB
410
RENDER IMAGE DATA
414
GENERATE AND DELIVER PRINTHEAD CONTROL SIGNALS
418
GENERATE IMAGE SIGNALS OF PRINTED IMAGE
422
IDENTIFY LOCATIONS FOR RADIATION APPLICATION
426
GENERATE AND DELIVER MICROHEATER CONTROL SIGNALS
430
MORE IMAGES TO PRINT?
434
YES
NO
STOP PRINTING
438
400

FIG. 5

SYSTEM AND METHOD FOR TREATING SURFACE OF MEDIA WITH A DIGITALLY ADDRESSABLE DRYER ARRAY TO REDUCE MOISTURE GRADIENT AND MEDIA COCKLE

TECHNICAL FIELD

This disclosure relates generally to inkjet printers, and, in particular, to media treatment in inkjet printers.

BACKGROUND

In general, inkjet printing machines or printers include at least one printhead that ejects drops or jets of liquid ink onto the surface of media. An inkjet printer employs inks in which pigments or other colorants are suspended in a carrier or are in solution with a solvent. Once the ink is ejected onto media by a printhead, the carrier is solidified or the solvent is evaporated to stabilize the ink image on the media surface. The ejection of liquid ink directly onto media tends to soak into porous media, such as paper, and change the physical properties of the media. Particularly with aqueous inkjet printing systems, water from the aqueous ink swells the cellulose fibers of the media and elongates the media in areas where an image is formed, but not in non-imaged areas. A moisture gradient is developed in the media due to these localized differences in moisture content and this gradient may problematically lead to localized lack of sheet flatness, which is commonly called media cockle. Media cockle adversely affects image quality.

Attempts have been made to reduce media cockle in previous printing systems. For example, printing systems utilizing web-fed media often apply a tension to the media to help elongate the dry areas to match the elongation of the wet areas. However, such media tension methods cannot be implemented in printing systems that utilize cut-sheet media due to the relatively short length of cut-sheet media compared to webs of media. Cut-sheet media printing systems often rely on a drying system that directs electromagnetic radiation or convection air to the surface of the media. These drying systems may lower the moisture content of the entire sheet of media, but they fail to address moisture gradients effectively since the gradients are caused by localized variations in moisture content attributable to varying amounts of aqueous ink ejected on the media at various locations. Printer configurations that reduce such media cockle are desirable.

SUMMARY

A printer, in one embodiment, comprises at least one printhead having a plurality of inkjets configured to eject ink, a dryer having an array of radiators, the array of radiators having a plurality of rows of radiators extending in a direction parallel to a process direction and a plurality of columns of radiators extending in a cross-process direction perpendicular to the process direction, each radiator configured to heat an area opposite the radiator at a predetermined distance, a media transport configured to move media past the at least one printhead to enable a surface of the media to receive ink ejected by the plurality of inkjets in the at least one printhead and to move the media in the process direction past the dryer to enable portions of the surface of the media to be heated by the radiators in the array of radiators, and a controller operatively connected to the at least one printhead, the dryer, and the media transport. The controller is configured to operate the plurality of inkjets in the at least one printhead to eject ink onto the surface of the media to form an image on the surface of the media, to operate the media transport to move the media past the at least one printhead and the dryer, and to activate selectively the radiators in the array of radiators to heat the portions of the surface of the media on which ink has been ejected.

A method of operating a printer is also disclosed. In one embodiment, the method comprises the steps of operating with a controller at least one printhead having a plurality of inkjets to eject ink to media, operating with the controller a media transport to move the media in a process direction past a dryer including an array of radiators to receive heat from the array of radiators, the array of radiators having a plurality of rows of radiators extending in a direction parallel to a process direction and a plurality of columns of radiators extending in a cross-process direction perpendicular to the process direction, and operating with the controller the dryer to selectively activate at least one of the radiators to direct heat to the media with respect to image data of the image formed on the media.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing aspects and other features of a printing system with a digitally addressable dryer that reduces moisture gradients and media cockle are explained in the following description, taken in connection with the accompanying drawings.

FIG. **1** is a schematic drawing of an inkjet printer that prints cut-sheet media.

FIG. **2** is a schematic drawing of a dryer array used in the inkjet printer of FIG. **1**.

FIG. **3** is a schematic drawing of another inkjet printer that prints cut-sheet media

FIG. **4** is a flow diagram of a process for operating the inkjet printer of FIG. **1**.

FIG. **5** is a flow diagram of a process for operating the inkjet printer of FIG. **3**.

DETAILED DESCRIPTION

For a general understanding of the present embodiments, reference is made to the drawings. In the drawings, like reference numerals have been used throughout to designate like elements. As used herein, the terms "printer," "printing device," or "imaging device" generally refer to a device that produces an image on print media with aqueous ink and may encompass any such apparatus, such as a digital copier, bookmaking machine, facsimile machine, multi-function machine, or the like, which generates printed images for any purpose. "Image data" refers to information in electronic form that are rendered and used to operate the inkjet ejectors to form an ink image on the print media. These data can include text, graphics, pictures, and the like. The operation of producing images with colorants on print media, for example, graphics, text, photographs, and the like, is generally referred to herein as printing or marking. Aqueous inkjet printers use inks that have a high percentage of water relative to the amount of colorant and solvent in the ink.

The term "printhead" as used herein refers to a component in the printer that is configured with inkjet ejectors to eject ink drops onto an image receiving surface. A typical printhead includes a plurality of inkjet ejectors that eject ink drops of one or more ink colors onto the image receiving surface in response to firing signals that operate actuators in the inkjet ejectors. The inkjets are arranged in an array of one or more rows and columns. In some embodiments, the inkjets are staggered in diagonal rows across a face of the printhead. Various printer embodiments include one or more printheads that form ink images on an image receiving surface. Some printer embodiments include a plurality of printheads arranged in a print zone. An image receiving surface, such as an intermediate imaging surface, moves past the printheads in a process direction through the print zone. The inkjets in the printheads eject ink drops in rows in a cross-process direction, which is perpendicular to the process direction in the plane of the media. "Process direction" refers to the direction in which the image receiving surface is moving. As used in this document, the term "aqueous ink" includes liquid inks in which colorant is in a solution, suspension or dispersion with a liquid solvent that includes water and one or more liquid solvents. The terms "liquid solvent" or more simply "solvent" are used broadly to include compounds that may dissolve colorants into a solution, or that may be a liquid that holds particles of colorant in a suspension or dispersion without dissolving the colorant.

As used herein, the term "hydrophilic" refers to any composition or compound that attracts water molecules or other solvents used in aqueous ink. As used herein, a reference to a hydrophilic composition refers to a liquid carrier that carries a hydrophilic absorption agent. Examples of liquid carriers include, but are not limited to, a liquid, such as water or alcohol, that carries a dispersion, suspension, or solution of an absorption agent. A dryer then removes at least a portion of the liquid carrier and the remaining solid or gelatinous phase absorption agent has a high surface energy to absorb a portion of the water in aqueous ink drops while enabling the colorants in the aqueous ink drops to spread over the surface of the absorption agent. As used herein, a reference to a dried layer of the absorption agent refers to an arrangement of a hydrophilic compound after all or a substantial portion of the liquid carrier has been removed from the composition through a drying process. As described in more detail below, an indirect inkjet printer forms a layer of a hydrophilic composition on a surface of an image receiving member using a liquid carrier, such as water, to apply a layer of the hydrophilic composition. The liquid carrier is used as a mechanism to convey an absorption agent in the liquid carrier to an image receiving surface to form a uniform layer of the hydrophilic composition on the image receiving surface.

FIG. **1** illustrates a high-speed aqueous ink image producing machine or printer **10** with features that reduce or eliminate moisture gradient and media cockle induced by localized depositions of ink on media. As illustrated, the printer **10** is a printer that ejects ink drops directly on a surface of a sheet of media **12**, and includes an electronic subsystem (ESS) or controller **14**, an endless belt **20** with rollers **22**, **24**, **26**, **28**, a mechanical de-curler **30**, a plurality of printhead modules **40**A-**40**D, a digitally addressable dryer array **50**, and actuators **18**.

Controller **14** is operatively connected to actuators **18**, printhead modules **40**A-**40**D, and dryer array **50**. Controller **14** is, for example, a self-contained, dedicated computer having a central processor unit (CPU) with electronic storage, and a display or user interface (UI). Controller **14** can be implemented with general or specialized programmable processors that execute programmed instructions. The instructions and data required to perform the programmed functions can be stored in memory associated with the processors or controllers. The processors, their memories, and interface circuitry configure the controllers to perform the operations described below. These components can be provided on a printed circuit card or provided as a circuit in an application specific integrated circuit (ASIC). Each of the circuits can be implemented with a separate processor or multiple circuits can be implemented on the same processor. Alternatively, the circuits can be implemented with discrete components or circuits provided in very large scale integrated (VLSI) circuits. Also, the circuits described herein can be implemented with a combination of processors, ASICs, discrete components, or VLSI circuits.

Controller **14** receives image data from an image data source **16**, such as a scanner or application program. The controller **14** renders the image data and generates firing signals that are used to operate inkjet ejectors in the printheads of the modules **40**A-**40**D to eject ink. The controller **14** also generates electrical signals to operate the actuators **18** to drive one or more rollers about which the endless belt **20** is entrained to move the endless belt about the rollers. The controller **14** further generates electrical signals corresponding to the image data from image source **16** to operate the dryer array **50** in a manner described more fully below.

Prior to an image being printed to media sheet **12**, media sheet **12** is retrieved from media storage (not shown) and fed through mechanical de-curler **30** by belt **20**. Mechanical de-curler **30** is configured with an S-shaped bend path, as shown in FIG. **1**. The S-shaped bend path of mechanical de-curler **30** helps attenuate any irregularities the media may have from its loading into the printer or its storage in the printer. The configuration of the de-curler **30** is particularly effective to reduce irregularities of the media in the cross process direction of media **12**. Sheet irregularities include folds, creases, wrinkles, or any other curl present in the media caused by media mishandling and other environmental factors, such as humidity. Preexisting sheet input curl is especially prevalent when cut-sheet media is used and the sheets are coated on one side only. In one embodiment, the curves in the S-shaped bend are symmetrical and have radii of between 5 to 20 mm (depending on the stiffness of substrate), which are useful to address sheet input curl in the first 3 to 5 inches of the media. The radii are at the lower end of this range for lower weights of media and at the higher end of the range for heavier weights of media.

After passing through mechanical de-curler **30**, media sheet **12** travels on endless belt **20** beneath printhead modules **40**A-**40**D so the printheads in the modules can eject ink onto one surface of the media with reference to image data from image data source **16**. Although the printer **10** includes four printhead modules **40**A-**40**D, each of which has two arrays of printheads, alternative configurations can include a different number of printhead modules or arrays within a module.

After media sheet **12** passes by printhead modules **40**A-**40**D, media sheet **12** passes under dryer array **50**. As shown in FIG. **2**, dryer array **50** includes a base **52** supporting a plurality of radiators **54** arranged in rows **56** extending in a process direction P**1** and columns **58** extending in a cross-process direction P**2**. The radiators **54** are configured to be selectively actuated by controller **14** with respect to image data from image data source **16** to emit electromagnetic radiation towards portions of the media sheet **12** containing an image formed with ink ejected by the printhead modules **40**A-**40**D. In one embodiment, the radiators **54** are infrared (IR) light emitting diodes (LEDs), each of which is configured to emit energy within the infrared (IR) spectrum, such as between 2-3 microns, although the radiators may be any other desired electromagnetic radiation emitter having any desired spectrum. Each radiator may be square-shaped, rectangular-shaped, circular-shaped, oval-shaped, diamond-shaped, or any other desired shape or combination of desired shapes.

In the embodiment shown, the outermost rows **56** of radiators **54** span a distance D**1**, and the outermost columns **58** span a distance D**2**. The distances D**1**, D**2** are selected to span the entire printable area of media sheet **12** that passes under the dryer **50**. In one embodiment, for example, the distance D**1** is 8.5" and the distance D**2** is 11" so that the dryer array **50** may cover media sheet **12** comprising standard-dimensioned **8.5**" by 11" paper. However, the distances D**1** and D**2** in other embodiments may be any desired lengths corresponding to any desired printable area for the largest size of sheet passing through the printer. In one particular embodiment, the dryer array instead comprises a linear array of radiators with a single, or several, columns **58** that span a distance D**1** corresponding to the width of media sheet **12**, or the printable area within media sheet **12**.

As media sheet **12** travels past dryer array **50**, controller **14** controls dryer array **50** to direct electromagnetic radiation towards portions of media sheet **12** containing the ink image by selectively actuating only the radiators **54** located above a portion of the media sheet containing the ink image. In this manner, based on the timing and speed of the media sheet, the controller **14** dynamically actuates radiators **54** to minor the image passing under the dryer array **50** so that electromagnetic radiation is directed only to those portions of media sheet **12** containing the ink image as media sheet **12** passes under the radiators **54**. Applying heat with radiators **54** in such a manner helps minimize media cockle induced by the deposition of ink on a media sheet by locally drying the media sheet only at portions of the media sheet where the ink image is formed. Targeting only portions of the media sheet containing the image further reduces moisture gradients compared with printing systems that dry the entire surface of the media sheet, or large areas or portions of the media sheet, including portions of the media sheet without the image, which provides for improved media cockle reduction.

The dryer array **50** defines a resolution depending on the type, size and number of radiators **54** in the dryer array **50**, the spacing between each radiator **54**, and the distance between the radiators **54** and media sheet **12**. Generally, a dryer array having a relatively higher resolution can be controlled more precisely to direct electromagnetic radiation to preselected areas of the media sheet **12** corresponding to portions of a printed image than a dryer array with lower resolution. This precision is possible because the electromagnetic radiation emitted from any single radiator **54** directed towards media sheet **12** spreads outwardly depending on the type of lens of the radiator and the distance between the radiator and media sheet. As a result, the effective area dried by the electromagnetic radiation emitted from any single radiator **54** depends on the type and size of the radiator **54**, and the distance between the radiator **54** and media sheet **12**. As used herein, the term "effective drying area" refers to the area on media sheet **12** that a single radiator emits electromagnetic radiation to dry ink on the media, which depends on the type and size of the radiator, and the distance between the radiator and media. An array of radiators **54** that covers a relatively larger effective drying area with a relatively lower number of radiators **54** has a lower resolution in which electromagnetic radiation may overlap into areas of media sheet **12** without any portion of the image to ensure that all imaged areas of media sheet **12** are radiated. In contrast, an array of radiators **54** that covers a relatively lower effective drying area with a relatively higher number of radiators **54** has a higher resolution in which the effective drying area radiated by each radiator **54** is small enough to enable imaged portions of media sheet **12** to be dried with relatively little, or no, overlap with the non-imaged areas of the media sheet **12**. Higher resolutions may provide for more refined drying to further reduce moisture gradient and media cockle depending on the size and complexity of the image printed.

In a particular embodiment, radiators comprise IR LEDs having a square-shape with each of the four sides being 2 mm in length. The dryer array is positioned with the radiators approximately 3 to 6 mm from the media sheet **12**. At this distance, space is provided between the radiators and media to allow movement of media **12** beneath the radiators, and to further allow circulation of cooling air. Moreover, at this distance the radiators **54** are close enough to media sheet **12** to minimize spreading of the electromagnetic radiation outwards to yield an array having a sufficient resolution. Moreover, in such an embodiment, the pitch, or distance between the centerline of each radiator is approximately 2 mm, the distance D**1** is approximately 365 mm, and the distance D**2** is approximately 520 mm. This high resolution array has approximately 47,450 pixels or radiators **54**, and is capable of directing electromagnetic radiation to intricate images jetted to media sheet **12** with low or little overlap into areas of media without the image.

With continued reference to FIG. **2** and FIG. **1**, dryer array **50** further includes a plurality of vent perforations **60** and **62** operably coupled to a blower **66**. In the embodiment shown, the vent perforations **60**, **62** are arranged in columns in the cross-process direction P**2**. The blower **66** is configured to blow a cooling fluid, such as air, through the plurality of perforations **60**, and suck the cooling fluid through the perforations **62**. In this manner, heat produced by radiators **54** during operation may be removed by the cooling fluid to keep the radiators **54** cool. Furthermore, the air between media sheet **12** and radiators **54** may be moist due to water from the aqueous ink jetted to media sheet **12** being evaporated by the electromagnetic radiation emitted by radiators **54**. Fluid flow from the perforations **60** past media sheet **12** and the radiators **54** and out through the perforations **62** removes moist air developed between media sheet **12** and radiators **54** and aids in increasing efficiency.

While the perforations **60** and **62** are shown positioned on either side of the array of radiators **56**, perforations may be located at other advantageous positions. For example, a column of radiators **56** may be replaced with a column of vent holes **60**, and another column of radiators **56** may be replaced with a column of vent holes **62**. As another example, some of the radiators **56** in a column are replaced with vent holes **60** while some of the radiators **56** in another column are replaced with vent holes **62**. In some particular embodiments, the vent holes do not replace the radiators **56** but are staggered between radiators **56**. In one such particular embodiment, the vent holes **60** are staggered in "even" number columns, and vent holes **62** are staggered in "odd" number columns. In another particular embodiment in which square radiators **56** having side lengths of 2 mm are utilized in the dryer array **50**, the vent holes **60**, **62** have a pitch in both the process direction and the cross process direction of about 20 mm.

FIG. **3** illustrates a high-speed aqueous ink image producing machine or printer **100** with features that reduce or eliminate moisture gradient and paper cockling induced by the deposition of ink on a media. As illustrated, the printer **100** is substantially similar to the printer **10** of FIG. **1**, where like numbers correspond to like parts, including an endless belt **20** with rollers **22**, **24**, **26**, **28**, a mechanical de-curler **30**, a plurality of printhead modules **40**A-**40**D, a digitally addressable dryer array **50**, and actuators **18**. Printer **100** further includes an image detector **148**, and an electronic subsystem (ESS) or controller **114** operatively connected to actuators **18**, printhead modules **40**A-**40**D, image detector **148**, and dryer array **50**.

A media sheet **112** is retrieved from media storage (not shown) and fed by belt **20** through mechanical de-curler **30** and past printhead modules **40**A-**40**D so the printheads in the modules can eject ink onto one surface of the media sheet with reference to image data from image data source **16** as explained above. After media sheet **112** passes by printhead modules **40**A-**40**D, media sheet **112** passes under image detector **148** and dryer array **50**. Image detector **148** in one embodiment includes a linear array of photo detectors configured to generate signals that are proportional to the amount of light reflected from an area of the media sheet **112** opposite each detector. Controller **114** is configured to process these signals received from image detector **148** and identify the areas onto which ink has been ejected and the areas not containing any ink. Radiators (not shown) of the dryer array **50** are selectively actuated by controller **114** with reference to identification of the inked areas obtained from the signals received from the image detector **148** to emit electromagnetic radiation towards the inked areas on the media sheet **112**. Compared to printer **10** which requires controller **14** to process very high resolution video data **16** used to print the image in order to control the dryer array **50**, data from image detector **148** does not require video processing in order to control the dryer array **50** with respect to printed image data since the image data is obtained from signals produced by image detector **148**. Therefore, compared to dryer **50** of printer **10** (FIG. **1**), dryer **50** of printer **100** (FIG. **3**) can be controlled autonomously and free from video processing.

In one specific embodiment, the number of photo detectors and the pitch, or distance between, each photo detector in the detector **148**, is selected to correspond to the number of rows of radiators and the pitch between the rows of radiators of the dryer. In this manner, one of the photo detectors of image detector **148** is aligned in the process direction P**1** with a corresponding row of radiators of the dryer **50**. Said another way, each row of radiators of the dryer **50** has a corresponding photo detector in detector **148**. Controller **114** actuates the radiators **54** based on detection signals from image detector **148** and times their activation to mirror the image passing under the dryer array **50** so the electromagnetic radiation is directed only to portions of media sheet **112** onto which ink has been ejected.

A process for operating a printer, such as printer **10** of FIG. **1**, having a dryer array to reduce media cockle is shown in FIG. **4**. A process for operating a printer, such as printer **100** of FIG. **3**, having a dryer array to reduce media cockle is shown in FIG. **5**. In the following description of these processes, statements that a process is performing some task or function refers to a controller or general purpose processor executing programmed instructions stored in a memory operatively connected to the controller or processor to manipulate data or to operate one or more components in the printer to perform the task or function. The controllers **14**, **114** noted above can be such a controller or processor. Alternatively, controllers **14**, **114** can be implemented with more than one processor and associated circuitry and components, each of which is configured to form one or more tasks or functions described herein.

According to process **300** of FIG. **4**, upon receipt of a printing job (block **310**), process **300** receives data of image content to be printed. These data are rendered to enable the process to generate the firing signals for the printheads (block **314**). With reference to these data, the process maps the ink pixels to be printed to identify the areas on the sheet where an ink coverage or ink mass threshold is exceeded and curl is possible. The process then identifies the radiators in the dryer array above the media that correspond to these areas and where heat is to be applied by one of the radiators **54** (block **318**). The signals for operating the radiators in the dryer array are generated and delivered to electrical current control devices, such as FETs, to enable current to flow to the radiators **54** corresponding to the areas where the ink coverage or mass could cause curl after the inkjet ejectors in the printheads are operated to print those areas and form an ink image on a media sheet (block **322**). After printing the image and drying the image with the dryer array, the process determines whether more image data are to be printed (block **326**). If more image data are to be printed, the process continues with the processing of block **314**. Otherwise, the printing operation ends (block **330**).

According to process **400** of FIG. **5**, upon receipt of a printing job (block **410**), process **400** receives data of image content to be printed. These data are rendered to enable the process to generate the firing signals for the printheads (block **414**). With reference to these data, the signals for operating the printheads are generated and delivered to printheads to print those areas and form an ink image on the media (block **418**). After printing the image, the image detector generates signals indicative of areas of ink coverage formed on the surface of the media (block **422**). The process then processes these signals to identify the radiators in the dryer array above the media that correspond to these areas and where radiation is to be applied by one of the radiators (block **426**). The signals for operating the radiators in the dryer array are generated and delivered to electrical current control devices, such as FETs, to enable current to flow to the radiators corresponding to the areas where the ink coverage or mass could cause curl after the inkjet ejectors in the printheads are operated to print those areas and form an ink image on the media (block **430**). After printing the image and drying the image with the dryer array, the process determines whether more image data is to be printed (block **434**). If more image data are to be printed, the process continues with the processing of block **414**. Otherwise, the printing operation ends (block **438**).

It will be appreciated that variations of the above-disclosed apparatus and other features, and functions, or alternatives thereof, may be desirably combined into many other different systems or applications. Various presently unforeseen or unanticipated alternatives, modifications, variations, or improvements therein may be subsequently made by those skilled in the art, which are also intended to be encompassed by the following claims.

What is claimed is:

1. A printer comprising:

at least one printhead having a plurality of inkjets configured to eject ink;

a dryer having an array of radiators and at least two vent openings, the array of radiators having a plurality of rows of radiators extending in a direction parallel to a process direction and a plurality of columns of radiators extending in a cross-process direction perpendicular to the process direction, each radiator configured to heat an area opposite the radiator at a predetermined distance, and the at least two vent openings being separated from one another in the process direction by a predetermined distance, each vent opening being configured to enable a flow of fluid to cool the array of radiators;

a blower configured to send a flow of fluid to one of the at least two vent openings and to receive the flow of fluid from the other of the at least two vent openings;

a media transport configured to move media past the at least one printhead to enable a surface of the media to receive ink ejected by the plurality of inkjets in the at least one printhead and to move the media in the process direction past the dryer to enable portions of the surface of the media to be heated by the radiators in the array of radiators; and

a controller operatively connected to the at least one printhead, the dryer, the blower, and the media transport, the controller being configured to operate the plurality of inkjets in the at least one printhead to eject ink onto the surface of the media to form an image on the surface of the media, to operate the media transport to move the media past the at least one printhead and the dryer, to activate selectively the radiators in the array of radiators to heat the portions of the surface of the media on which ink has been ejected, and to operate the blower to circulate the flow of fluid through the at least two vent openings to cool the array of radiators.

2. The printer of claim **1**, the controller being further configured to:

activate each radiator in the array of radiators in response to any portion of the surface of the media onto which ink has been ejected being opposite the radiator.

3. The printer of claim **2**, the controller being further configured to:

deactivate each radiator in the array of radiator in response to the portion of the surface of the media onto which ink has been ejected is no longer opposite the radiator.

4. The printer of claim **1**, the at least two vent openings further comprising:

a first plurality of vent openings extending in a column in the cross-process direction; and

a second plurality of vent openings extending in a row in the process direction.

5. The printer of claim **1** further comprising:

at least one image sensor configured to generate signals corresponding to the surface of the media; and

the controller is operatively connected to the at least one image sensor to receive the signals generated by the at least one image sensor and the controller being further configured to activate and deactivate the radiators in the array of radiators with reference to the signals received from the at least one image sensor.

6. The printer of claim **5** wherein the at least one image sensor is at least one photo detector.

7. The printer of claim **1** wherein each radiator in the array of radiators is an infrared emitter.

8. The printer of claim **7** wherein each infrared emitter in the array of radiators is an LED infrared emitter configured to generate electromagnetic radiation having a wavelength in a range of about two to about three microns.

9. A method of operating a printer comprising:

operating with a controller at least one printhead having a plurality of inkjets to eject ink to media;

operating with the controller a media transport to move the media in a process direction past a dryer including an array of radiators to receive heat from the array of radiators, the array of radiators having a plurality of rows of radiators extending in a direction parallel to a process direction and a plurality of columns of radiators extending in a cross-process direction perpendicular to the process direction;

operating with the controller the dryer to selectively activate at least one of the radiators to direct heat to the media with respect to image data of the image formed on the media; and

operating with the controller a fan to circulate fluid through at least two vent openings in the dryer to cool the array of radiators, the at least two vent holes being spaced with respect to the process direction.

10. The printer of claim **9** further comprising:

operating with the controller the dryer with respect to image data to direct heat to the portion of the media containing the image by operating the controller to activate each radiator having a corresponding heat zone containing a portion of the media with at least a portion of the formed image.

11. The printer of claim **10** further comprising:

operating with the controller the dryer to selectively activate each radiator when the portion of the media containing the portion of the formed image enters the corresponding heat zone.

12. The printer of claim **10** further comprising:

operating with the controller the dryer to selectively deactivate the radiators after the portion of the media containing the formed image passes through the respective heat zone.

13. The printer of claim **9**, further comprising:

operating with the controller a fan to circulate fluid through a first plurality of vent openings extending in a column in the cross-process direction and a second plurality of vent openings spaced with respect to the process direction and extending in a column in the cross-process direction.

14. The printer of claim **9** further comprising:

operating with the controller at least one image sensor to generate signals corresponding to image data of the image formed on the media.

15. The printer of claim **9** wherein:

operating with the controller at least one photo detector to generate signals corresponding to image data of the image formed on the media.

16. The printer of claim **9** wherein operating the plurality of radiators comprises operating a plurality of infrared emitters.

17. The printer of claim **16** wherein operating the plurality of infrared emitters comprises operating a plurality of LED infrared emitters to generate electromagnetic radiation having a wavelength of 2-3 microns.

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